T he Campaign for Physics, the science development initiative of the APS and the American Association of Physics Teachers (AAPT) launched in the fall of 1995, attained its $5 million funding goal. A victory celebration was held November 22, 1997 in San Francisco, CA. The evening included remarks from key campaign leadership, endorsements from participants in Campaign programs and recognition of campaign volunteers. Funding from the Campaign has allowed APS to launch and expand five important science education programs which are having a dramatic impact on improving the teaching of science in schools across the country.

According to Campaign Director Darlene Logan, the effort benefited greatly from the financial and volunteer support of major industrial leaders, including William R. Hewlett, Co-founder of Hewlett-Packard Company, who led the Campaign’s Executive Committee as honorary chair. Working with him were leading captains of industry who served as members of the Campaign Executive Committee. These included Robert Allen, ATK; Paul Allaire, Xerox Corporation; Norman Augustine, Lockheed Martin Corporation; Livio DeSimone,

Corporate representatives and campaign program participants joined in the Campaign’s and its victory. From left right (clockwise): Lewis Platt, Hewlett-Packard Company; D. Allan Bromley, 1997 APS President; Joan Platt, wife of Lewis Platt; Nicholas Bloembergen, Campaign Administrative Group Chair; Jan Huster, Bay Area Schools for Excellence in Education (benefiting from the Teacher-Scientist Alliance Institute); Gine Hunter, husband of Jan Hunter; Barbara Omelich, 3M Foundation director; Nancy Thomas, Hewlett-Packard Company contributions manager; Lee Thomas, husband of Nancy Thomas; Dali Bloomberg, wife of Nicholas Bloembergen.

The Campaign for Physics celebrates reaching $5 million funding goal through the support of major industrial leaders, including William R. Hewlett, Co-founder of Hewlett-Packard Company, who led the Campaign’s Executive Committee as honorary chair. Working with him were leading captains of industry who served as members of the Campaign Executive Committee.

**Campaign for Physics Celebrates Reaching $5 Million Funding Goal**

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**Fluid Researchers Gather for 1997 DPF Meeting...**

**New research results in turbulence control, nonequilibrium, and turbulent dynamics were among the highlights of the 1997 fall meeting of the APS Division of Fluid Dynamics.**

**Historical Facal...**

**This is the 1997 anniversary issue of Photonics Today.**

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**Francis M. Pipkin Award is established. Student research fellowships announced with $5,000 awarded; APS Fellowship deadline summary; Lewis Platt, Hewlett-Packard Company Foundation Director; George Soros, Soros Fund Management & Soros Foundation Network; and Alex Trotman, Ford Motor Company. Together with the support of 39 Nobel Laureates serving on a Campaign Council of Nobel Laureates, the campaign raised $3.5 million in corporate and foundation gifts including one seven-figure gift and 11 six-figure gifts.**

"Through the Campaign, we have been able to join the science community into the kind of technology in which we believe," said Hewlett, who considered the Campaign an imperative. "We have created support structures for science teachers, particularly in urban settings, who are seeking ways in which to improve their teaching skills and techniques and developed a resource center for their use in obtaining information on the best in science teaching curricula and materials." He added that the Campaign funds are also being used to provide mentors and financial support to undergraduate minority students interested in pursuing careers in science, and to help establish mechanisms for the exchange of information among academia, industry and government on science education and industrial needs.

Nobel laureate Nicolas Bloembergen, Harvard University and a past president of APS, chairs the Campaign’s Campaign Council of Nobel Laureates and Campaign Administrative Group, the internal steering committee for the initiative. "The careful development of science education programs of the Campaign for Physics will make a dramatic difference in elementary through graduate level science teaching, benefiting students, teachers, industry and our nation," he said of his involvement. "I am proud to have played a leadership role in support of such excellent initiatives."

In addition to the Corporate and Foundation Gifts Campaign, an effort to obtain the support of individuals was led by an Individual Gifts Committee. Chaired by John Armstrong (formerly of IBM Corporation) the committee included 11 outstanding members of the physics community, each of whom made a leadership gift to the Campaign and encouraged others to participate. The committee generated over $1.5 million in individual gifts including 25 gifts of $10,000 or more. "I am pleased that I was able to contribute to this key undertaking by APS and AAPT as it is important that we, as physicists, contribute to the support of science education now and in the future," Armstrong said.

"The Campaign for Physics is proud to have assembled an impressive and dedicated group of leaders in the business community who have contributed to the continued success of the Campaign," Logan said. "This group is made up of Nobel laureates, distinguished leaders in industry, government and academia who will serve as key campaign leaders. Their support has been instrumental in bringing the science education program to fruition. The Campaign for Physics is pleased to have the support of the industrial leaders and to be leading the way in supporting physics research and education."
Cherry Murray Pursues Excellence in Industrial Research

Juggling a demanding career in condensed matter research and industrial management with volunteer work and family obligations is just the latest in a lifetime of challenges for Cherry Murray, the physicist who is currently director of the Physical Research Laboratory at Bell Laboratories/Lucent Technologies in Murray Hill, New Jersey. A fellow of both the APS and the American Association for the Advancement of Science, Murray has a broad background in experimental research in low temperature, surface, condensed matter, and complex fluid physics, with particular emphasis on light scattering and imaging.

Ironically, Murray had always expected to become an artist, thanks to the influence of her parents, both of whom had studied art at a Paris art academy. But her father's death and her mother's emigration to Taos, NM, her father also holds a degree in English literature, and was an English teacher and headmaster of a private school prior to embarking on a diplomatic career after a stint in the US Army during World War II. The family moved to New Jersey before assuming her present position in June 1997. The Physical Research Laboratory has approximately 100 researchers in fundamental physics, applied physics, mathematical sciences, biophysics, and chemistry. Murray herself has volunteered as a mentor for several physics graduate students. She is now a research physicist at Lawrence Livermore National Laboratory; a chemist-teacher at her high school in Alexandria, Virginia, encouraged her abilities in physical chemistry and physics, and when the family subsequently moved to Korea, she studied calculus and physics and learned to paint at an artist's colony in Taos, NM. Her father also holds a degree in English literature, and was an English teacher and headmaster of a private school prior to embarking on a diplomatic career after a stint in the US Army during World War II. The family moved to New Jersey before

Despite her enjoyement of lessons in piano, dance, and art, Murray credits her brother, John, nine years her senior, with first piquing her interest in physics at the age of 6 when he decided to study physics during the height of the Space Race. He is now a research physicist at Lawrence Livermore National Laboratory; a chemistry teacher at her high school in Alexandria, Virginia, encouraged her abilities in physical chemistry and physics, and when the family subsequently moved to Korea, she studied calculus and physics and learned to paint at an artist's colony in Taos, NM. Her father also holds a degree in English literature, and was an English teacher and headmaster of a private school prior to embarking on a diplomatic career after a stint in the US Army during World War II. The family moved to New Jersey before

Murray received her PhD in physics from MIT in 1978, and promptly joined the technical staff at Bell Labs, becoming a distinguished member in 1989. She subsequently had the Low Temperature and Surface Physics Laboratory in Berkeley, where she worked on magnetic materials and devices. She later became a full professor at MIT, where she was a principal investigator in the postdoctoral program in condensed matter physics. Murray is now a research physicist at Lawrence Livermore National Laboratory; a chemistry teacher at her high school in Alexandria, Virginia, encouraged her abilities in physical chemistry and physics, and when the family subsequently moved to Korea, she studied calculus and physics and learned to paint at an artist's colony in Taos, NM. Her father also holds a degree in English literature, and was an English teacher and headmaster of a private school prior to embarking on a diplomatic career after a stint in the US Army during World War II. The family moved to New Jersey before

Murray’s only research program currently encompasses imaging of order-disorder transitions in colloidal crystals, self-assembly of optical materials, and Raman scattering from very small monodisperse silicon quantum dots. In 1989, she received the APS Maria Goeppert-Mayer Award for the experimental methods she used to discover ‘two stage’ melting in mixtures of colloidal polystyrene spheres, singled out particularly for her elucidation of the role that defects play in this phenomenon, as well as the connection between her discovery and recent theories of melting dimensions.

Although her own graduate experiences were highly positive, Murray says she is not surprised at young physicists to choose their school carefully, particularly if they wish to study with specific professors at smaller schools. “If you know exactly what you want to do, and who you want to work with, then they’re available and will be able to take you on as a student,” she says. But the most important advice she would give is to find a good mentor, citing as an example the efforts of Mildred Dresselhaus, a professor of electrical engineering at MIT, who organizes seminar series for graduate students to give talks on their research topics.

Murray herself has volunteered as a mentor for several physics graduate students, in addition to participating in a hands-on science program at a local junior high school to encourage young women to pursue careers in physics. Within the APS, she has held several positions in APS divisions, served on the executive committees of the Forums on Education and Industrial and Applied Physics, and on the Panel on Public Affairs, as well as various prize and fellowship committees. She is currently chair of the APS Prize Committee.

Despite her considerable professional commitments and volunteer work, Murray has still found time to marry and raise a family. She has a son, age 11, and a daughter, age 6, and credits the availability of an excellent child care center in New Jersey with making her dual role much easier. “It’s usually child care arrangements that are the difficulty,” she says. “I was very fortunate that the center had openings for both my children.” She even occasionally finds time to play the piano and take dance classes to keep physically active.

While she can envision one day obtaining a position as a university professor having an impact on the field by producing excellent students, she finds her current position far too challenging and enjoyable to consider changing career paths any time soon. “Someone described my new job as trying to drink from a fire hose, with things flying at you all the time, but I enjoy that kind of challenge,” she says. “I definitely enjoy managing and having an impact by working in industry, so I see myself doing this for a while.”

### APS Outreach Programs for Minorities and Women at a Glance

**Colloquium Speakers Lists of Women and Minorities in Physics**, available online and in hard copy, list the names and titles of women and minority physicists, indexed by field and state.

**Travel Grants for Minority and Women Physicists Programs**. The APS provides small grants to physics departments to fund visits by minority and women colloquium speakers. Funding is still available for the 1997-1998 academic year.

**The Gazette** is the official newsletter of the Committee on the Status of Women in Physics (CSWP), featuring updates on CSWP activities and programs, book reviews, statistical reports, and articles on programs designed to increase the participation of women in physics. The Committee on the Status of Women in Physics (CSWP), featuring updates on CSWP activities and programs, book reviews, statistical reports, and articles on programs designed to increase the participation of women in physics. The Committee on the Status of Women in Physics (CSWP), featuring updates on CSWP activities and programs, book reviews, statistical reports, and articles on programs designed to increase the participation of women in physics. The Committee on the Status of Women in Physics (CSWP), featuring updates on CSWP activities and programs, book reviews, statistical reports, and articles on programs designed to increase the participation of women in physics. 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The Physical Science Resource Center

The American Association of Physics’ Physical Science Resource Center provides on-line access as well as hard copies of teaching and learning materials in physics at the high school and undergraduate levels. The information center includes bibliographies on the best physics teaching technologies, materials and procedures.

The Minority Scholarship Program

Established in 1980 by the APS, this highly successful program is able, as a result of Campaign funding, to increase the number of scholarships for undergraduate physics majors awarded annually to its highly qualified pool of applicants. This program consists of three support components: 1) a monetary grant to the student; 2) a faculty mentor for the student, and 3) a monetary grant to the student’s host physics department to promote a relationship between the department and the scholarship recipient. To date, a total of 37 new and renewal scholarships have been awarded and an impressive 20% have also gone on to earn their Ph.D. in physics.

The Academic-Industrial-

The Roundtables are a one-day meeting of leading academic and industrial scientists with educators and government and community leaders. Through a plenary session of invited speakers and a series of workshops, participants examine how to address the economic and educational challenges facing their state and region. Roundtables are sponsored by the APS, the NSF, local universities and industries and are co-hosted by the region’s Members of Congress. Three such roundtables have taken place to date in Virginia, California, and Washington states with the next one planned for Connecticut.

In depth descriptions of the Campaign for Physics program goals can be found in the insert in the June 1997 issue of APS News, the January 1998 APS Education Outreach Insert, and through the APS home page (www.aps.org).

Andria Erizberger, a lead teacher in the Physics Teacher Resource Agent Program speaks to the important support that program is providing to physics teachers in the San Francisco area.

IN BRIEF

Committee on Careers and Professional Development

At its November meeting, the APS Council voted to approve a proposed amendment to the APS Bylaws that would change the name of the Committee on Applications of Physics (APAC) to Career and Professional Development (CPD), and revise its charge. The change was suggested by the APS Committee on Committees, and approved by the Committee on Constitutions and Bylaws before being submitted to Council. The rationale behind the change is that, with the addition of the Forum on Industrial and Applied Physics (FIAP), much of the work that CAP used to do — such as organizing sessions at meetings — was taken on by FIAP. It was also felt that the APS needs an advisory body and a clearing house for its career activities.

The recent Task Force on Careers and Professional Development recommended that an APS committee be charged with these responsibilities. The revised charge in the APS Bylaws will read as follows. “The membership of the Committee on Careers and Professional Development shall consist of members appointed by the Chair and by members of the Forum on Industrial and Applied Physics (FIAP).”

The Chair shall be responsible for coordinating affairs within the Society concerned with career and professional development in physics and advising the Society on courses of action. The Committee shall also facilitate the participation of physicists from all career paths in the Society and its functions and publications.” Comments from the membership on the proposed revision should be submitted to Amy Halsted at APS headquarters.

Doubting Non-Defense R&D

On December 4, 1997, two Republican and two Democratic senators wrote to President Clinton urging him to use the FY 1999 budget to establish a bipartisan national consensus on doubting non-defense federal R&D. The next day, President Clinton sends his FY 1999 budget request to Congress this month. At the Office of Management and Budget, officials are confronting some tough numbers. Under the balanced budget agreement, total discretionary spending can increase by only 1%, or about $30 billion, over this year. As expected, there are many conflicting recommendations on what the nation’s priorities should be in FY 1999. The letter from Senators Phil Gramm (R-Texas), Joseph Lieberman (D-Connecticut), Pete Domenici (R-New Mexico), and Jeff Bingaman (D-New Mexico), all cosponsors of S. 1305 (see APS News, January 1998), urges Clinton to “take the lead on this important issue and include significant increases in R&D investment” in the FY 1999 budget request, especially for the 12 federal agencies specified in the bill. The letter coincides with an electronic alert to APS members by APS Past President D. Allan Bromley (Yale University) to add their support by writing to Clinton as well.

Task Force on APS Prizes and Awards

The APS Executive Board has appointed a new Task Force on APS Prizes and Awards, chaired by Mildred Dresselhaus (Massachusetts Institute of Technology), with a primary charge to consider the full range, breadth, and number of APS prizes and awards to see if they are appropriate and if all areas of the physics community are covered in an equitable manner. In particular, the Board is interested in advice on under which conditions the APS would accept funding for additional prizes and awards if offered, and whether some of the criteria for existing prizes and awards should be broadened to encourage more nominations. Additional topics to include whether there should be a minimum monetary award for the major APS prizes and whether the APS should change the current policy on multiple recipients for a prize or award. A preliminary report will be presented at the Executive Board’s February 21 meeting. The other members of the task force are Robert W. Dicke, Princeton University; Robert W. Gurney, National Institute of Standards and Technology; Wick C. Haxton, University of Washington; Rolf W. Landauer, IBM T J Watson Research Center; John M. Rowell, John Rowell Inc.; and Frank J. Sculli, Columbia University.

National Medal and Presidential Early Career Winners

Recipients of this year’s National Medal of Science, announced in December by President Clinton, included three Fellows of the American Physical Society: Darlene Hoffman, a professor of chemistry at Berkeley, for her work on transuranium elements; Harold Johnston, emeritus chemistry professor at Berkeley, for contributions to atmospheric chemistry; and Marshall Rosenbluth, a plasma physicist at UCSF, for fusion research. The medal was awarded posthumously to Martin Schwarzschild of Princeton for fathering stellar evolution.

Last November, President Clinton presented 60 young researchers with the second annual Presidential Early Career Awards for Scientists and Engineers (PECASE). APS member David S. Cittin, a professor in the Department of Physics at Washington State University, was among those honored for developing a comprehensive theory of excitons in semiconductor nanostructures. Those selected receive up to $500,000 over a five-year period to further their research and advance science for government missions.

New Funding Initiatives

President Clinton announced two new research and development partnership initiatives that will lever more than $120 million in government and industry funds. Federal government funding is $96 million, already appropriated for the current fiscal year, with the remainder coming from industry. First, the Defense Department and the semiconductors industry will fund long-term R&D at universities intended to eventually allow US companies to manufacture a supercomputer on a chip. This initiative is being funded by the Defense Department’s $134 million Government-Industry Co-sponsored University Research program. Second, the Commerce Department’s Advanced Technology Program (ATP) will provide $28 million in cost-shared funds for eight new competitions to support R&D with broad-based benefits to the US economy. More than half of all ATP grants have gone to small companies or joint ventures led by small companies.
APS Junior Member Survey: Perceptions of the Job Market

by Sherrie Preishe, APS’ Executive Office

There is presently a rumor among some physicists that the job crunch for recent PhDs in physics is over. This was discussed in the first half of the ‘90s, is now a distant memory. It is said that there are now plenty of easily obtained jobs for physicists — the crisis is over. What support is there for this story and what do young physicists think of it?

To help us get some understanding of the present job climate and the mood of recent degree recipients, the APS, under the auspices of CAP/Committee on Careers and Professional Development (see In Brief article on page 3), did an email survey of junior members in October 1997. Upon graduation, student members may become junior members (full membership, but half the regular dues rate) for three years. This is a group of young physicists starting their careers. There was a strong response to this survey — 43%. This includes 592 replies from recent PhD recipients.

Survey responses reinforce a supposition that our junior members remain more closely aligned with physics than the general population of recent physics PhD graduates. Assuming this is the case, these survey responses are given by people who are doing “better” (by the terms of what a physics career is typically expected to be) than the overall population of recent graduates. The major employment sectors for our PhD respondents are post-docs 53%, industry 17%, tenure-track 11%, and university or government research staff 9%.

Junior members are worried about their own future careers. The strength of this feeling varies by the type of job people hold. Post-docs are most concerned while those in industry or tenure-track positions feel more secure about their future. When asked, Are you worried about career prospects for the future, such as finding a permanent job with opportunity for advancement?

- 70% of PhD respondents say they are worried about career prospects.

When asked, Do you expect to remain in your present type of career path over the next 5 years? Junior members expect to make a major career change — 60% of PhD respondents lean toward expecting to stay in their present career path over the next 5 years. 40% don’t know or think they may have to make a major career change. Again, post-docs are slightly less secure, with 48% not sure that they can stay in their present type of career path over the next 5 years.

Why are people considering a major career change? The overwhelming highest reason given is “lack of opportunities for me in my present career path”. This is the first or only reason for 40% of respondents and mentioned as a reason by 54%. The next highest reason is “family or other personal considerations”, mentioned by 31% of respondents. These are followed by “developed new interests” and “job security”, mentioned by 26% and 24% of respondents.

With this degree of insecurity and pessimism about their career future, it seems that recent PhDs do not think that the job problem is over. That, do they really have cause for concern?

- Few (less than 1%) are unemployed.
- Only 2% of PhD respondents say they found it very difficult to secure their present job.
- Only 7% of PhD respondents do not find their job professionally challenging.
- When asked how their present job compares to their expectations when they started graduate school, few (6%) say their job is very different from what they expected and unfavorable; 21% say their job is very different from what they expected, but favorable, and 40% are doing what they thought they would be doing at this point in their careers.

A majority found it somewhat easy to secure their present job, with graduates in 1997 showing slightly more confidence, so much is discussed in the past. You can say it was easy to secure their jobs compared to previous classes.

When asked, Are you worried about the future of your present type of career path over the next 5 years? Junior members expect to make a major career change.

When asked, Do you think it is easier or more difficult to find a job in physics?

- 30% think that it is easier (included in this are 5% who think that it is much easier).
- 21% think that it is the same, and 20% think that it is more difficult.

On a scale of 1 to 5, where 1 is much easier, 3 is the same, and 5 is much harder, the average response is 2.9.

When asked, Compared to 3 years ago, do you think it is easier or more difficult to find a job in physics?

- 24% think that it is easier, 20% think that it is the same, and 56% think that it is more difficult.

Another survey response is given by people who are doing “better” (by the terms of what a physics career is typically expected to be) than the overall population of recent graduates. The major employment sectors for our PhD respondents are post-docs 53%, industry 17%, tenure-track 11%, and university or government research staff 9%.

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- 21% think that it is the same, and 20% think that it is more difficult.

On a scale of 1 to 5, where 1 is much easier, 3 is the same, and 5 is much harder, the average response is 2.9.
ICF—There were many talks on in situ confinement fusion (ICF), especially on topics related to the 192-beam, 2 Mequgale National Ignition Facility (NIF) under construction at LLNL. Not surprisingly, the focus of ICF research revolves around reining in the understanding of thermal conduction, the physics of interaction of intense light with plasma, capsule implosions, and firming up the designs for ignition. Other ICF laser presentations included talks on the "fast ignition" scheme for ICF, in which an ultra-intense short-laser pulse could supply the ignition spark of a compressed ICF target, and impressive increases of x-ray yields from Sandia's Z-pinch.

Plasma Applications

Medical physics—At a Thursday morning session, Richard London of LLNL described how models developed for laser medicine and fusion interact. In medicine, laser surgery is being applied to remove tumors and treat skin lesions. In medicine, it is being applied to treat tumors and treat skin lesions. Laser fusion and medicine may be described by similar physics relations and models, such as for the semiconductor industry; compact accelerators; plasma diagnostics; medical physics; and spacecraft.

Electronic Publication of Physical Review D Articles

In recent years, the physics community, particularly in the fields covered by Physical Review D, has experienced an increase in electronic publishing. These changes have resulted in accommodating to accessing the current literature electronically. In keeping with this trend, Physical Review D is changing its production process so that all articles will be published electronically, with the printed version appearing at a subsequent date. As at present, the printed and online versions will be visually identical. This new process begins with the articles of Volume 57 (the January-June 1998 print issues) and includes all articles currently accepted. In "making this change, we are moving from a batch mode that focussed on the production of an entire printed issue to one that allows each article to be published as soon as it is ready," said FDR Editor, Jack Weingberg (University of Washington). For well-prepared manuscripts, our goal is to send page proofs to the author two weeks after receipt. For author-generated final versions, the articles will be posted as part of the electronic journal, with the date of posting being listed as the publication date of the article. At monthly intervals these articles will be collected together to make up the printed issues that will appear. According to the division by subject area as at present, on the 1st and 15th of each month. In a six-month transitional phase, full citation information (volume and page number) will only be available when all of the articles comprising a given print issue have been posted. Beginning with the first issue of Volume 58 (print date 1 July 1998), the journal will change to a continuous publication, with each article numbered, the article number being assigned at the time that the article is published electronically. Articles will then be fully citable as soon as they appear in the online journal.

APS News

Free JETP Letters Online

In an effort to promote the online publication of the Journal of Experimental and Theoretical Physical Letters (JETP Letters Online) the American Institute of Physics (AIP) is offering free access to current subscribers of Physical Review Letters-online from October 15, 1997, through December 31, 1998. One of the major physics journals published in Russia, JETP Letters Online contains in-depth, short topical reports of experimental research in all fields of physics—-from solid state to elementary particles. Its first-hand reports of the current state of research in the former Soviet Union place it among the most coherent journals serving physicists both in the former Soviet Union and laboratories around the world.

The online edition provides access to JETP Letters Online articles beginning with January 1992, and includes the following features: access to a referenced article's abstract; new download options to enable users to print full-text Postscript or PDF files for each published article; and "See also" links providing access to related information as of the date the paper was published. Business customers, who wish to purchase electronic rights for internal use, may gain immediate access to JETP Letters Online at http://www.aip.org/jetplo, using their current username and password. They will also link from one letters journal to the other.

For technical questions, contact AIP at 516-576-2262, or via e-mail: ojshelp@aip.org.

In case the need arises, electronic access will be continued. APS members may access the electronic version of Physical Review D at http://proceedings.aip.org/prdhome.html

At what rate are physics departments hiring early career physicists?

In 1995-96, 1,438 PhDs were granted by US physics departments. In 1995-96, the PhD production rate has been increasing by about 25%. This growth in PhD production rate, coupled with the increased hiring of PhD physicists by about 25%, has resulted in increased hiring of PhD physicists, especially in fields other than physics departments. Hires by other departments increase the total number of hires of PhD physicists by about 25%.

Many additional applications are already online.
Fluid Dynamics Researchers Meet in San Francisco

New research results in turbulence control, sonoluminescence, and biofluid dynamics were among the highlights of the 1997 fall meeting of the APS Division of Fluid Dynamics, held 23-25 November in San Francisco. Nearly 9500 credited papers were presented in addition to several invited lectures. In addition, the 1997 recipients of the APS Fluid Dynamics Prize and Otto LoForte Award spoke at a special awards program on Sunday afternoon. The meeting also featured the 15th Annual Gallery of Fluid Motion, an exhibit of contributed photographs and videos of experimental fluid dynamics. Outstanding entries, selected for originality and their ability to convey and exchange information, will appear in the September 1998 issue of Physics of Fluids.

MEMs and Turbulence Control

Recent experiments and simulations have demonstrated the feasibility of active boundary layer control, according to Sudeep Kumar and William Reynolds of Stanford University, who spoke at a Tuesday afternoon session. They have developed actuator arrays using a combination of micromachining technologies along with mesoscale assembly. An array consists of eight piezoelectric-ceramic micron actuators with integrated cavities and guide gaps, with fluidic driving constants ranging between 100-500 N/m. In addition, the actuator has milliseconds rise times with power consumption in the milliwatt range.

At the same session, Steve Tung of CalTech described how his team has designed and fabricated multiple arrays of micron-sized micro shear-stress sensors, intended to temporally and spatially resolve the small stream-wise streaks in the near-wall region of a turbulent boundary layer. Using these sensors, the turbulent surface shear stress distribution has been measured, and the high shear stress streaks have been identified and analyzed. Based on the temporal data, Tung’s group found that a high correlation exists between the peak shear stress level and the leading edge shear stress gradient of a high shear stress streak. This information is currently being applied to the design of a real-time flow control logic, which is part of a MEMS-based neutron system for active turbulent shear-stress control.

Synthetic Jet Actuators

An Glezer of the Georgia Institute of Technology described his novel approach to the manipulation and control of shear flows using fluidic technology based on synthetic jets. These jets, with fluidic driving constants ranging between 100-500 N/m, have milliseconds rise times with power consumption in the milliwatt range.

Biofluid Dynamics

According to Charles Peskin of New York University, who spoke on Monday afternoon, the fluid in the heart involves the interaction of blood, a viscous incompressible fluid, with the flexible, elastic, fiber-reinforced heart valve leaflets that are immersed in that fluid. Neither the fluid motion nor the valve leaflet motion are known in advance, both must be computed simultaneously by solving their coupled equations of motion. Peskin has developed a means of accomplishing this simulation using his immersed boundary method, which can be extended to incorporate the contractile fiber architecture of the muscle heart walls, as well as the valve leaflets and the blood. The result is a three-dimensional model of the heart, which can be used as a test chamber for the design of prosthetic cardiac valves, and also to study the function of the heart in health and in disease.

Dogs and other scenting animals detect airborne odor molecules with extraordinary sensitivity. According to W.G. Settles of Penn State University, who spoke on Tuesday afternoon, aerodynamic sampling plays a key role in this, although little is known about the mechanistic details of the aerodynamics thereof. To this end, he visualized the airflow generated by a scenting dog using the so-called “schlieren technique.” He observed that a dog stops panting in order to scent, since panting produces a turbulent jet which disturbs the scent-bearing air currents. Furthermore, inspiratory airflow enters the nostrils from straight ahead, while expiratory airflow is directed to the sides of the nose and downward. Thus, the curvature and geometry of a dog’s nose modulates the airflow during scenting. The eventual practical application of his work is to achieve a sufficient level of understanding of the aerodynamics of canine olfaction to design a mimicking device.

Historical Profile

Leo Szilard

Leo Szilard was born 100 years ago on February 11, 1898, in Budapest, Hungary, and emigrated to the US in 1938. Szilard left Germany in 1933 because of the worsening situation for its Jewish citizens. He initially planned to study electrical engineering, but switched to physics while studying at the Technische Hochschule in Berlin, Germany. At Columbia University, he repeated the Hahn-Strassman experiment demonstrating nuclear fission and helped compose the letter signed by Albert Einstein imploring Franklin Roosevelt to consider development of a fission bomb. Although known for his contributions to nuclear fission and development of the world’s first atomic bomb as a member of the Manhattan Project, Szilard is most remembered for his later efforts to understand fundamental physics. Throughout his life, he was an exceptionally responsible use of science. Szilard was a founding member of the Federation of Atomic Scientists, which worked to keep control of atomic energy out of the hands of the military, as well as the Council for a Livable World in Washington, DC. He later turned his attention to a professor at the University of Chicago, developing the chemoster, an instrument that aids in the study of bacteria and viruses by regulating the possibility of thermonuclear fusion,” he said.

Scenting Dogs

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Leo Szilard Award for Physics in the Public Interest

The APS Forum on Physics and Society established the APS Leo Szilard Award for Physics in the Public Interest in 1974 in recognition of Szilard’s concern for the social consequences of science.

The Forum has recently launched an effort to establish a $60,000 endowment to convert the Szilard Award into a lectureship award in which the recipients would receive funds to speak about their work at two or more institutions. The objective of the lectureship format would be to provide exposure for outstanding physicists who have applied their science for the benefit of society and, hopefully, act as positive role models. Those interested in making a donation should send their contribution (payable to APS-Szilard Fund) to: Barbara Levi, 1610 La Vista del Oceano, Santa Barbara, CA 93109.
Francis M. Pipkin Award is Established

At its November meeting, the APS Council approved establishment of the Francis M. Pipkin Award. It is intended to recognize exceptional research accomplishments by a young scientist in the interdisciplinary area of precision measurement and fundamental constants, and to encourage the wide dissemination of the results of that research. The Pipkin award will be presented biennially and consist of $2000 plus support of travel expenses to attend the APS meeting at which the award will be conferred.

Funding to endow the Pipkin award was established by the Topical Group on Precision Measurement and Fundamental Constants a memorial to Francis M. Pipkin. Pipkin was a professor and chair in the Department of Physics at Harvard. He served as thesis advisor to more than 50 PhD students in a broad range of experimental physics topics including atomic, molecular, optical, nuclear, and particle physics.

Chaired by Louis W. Anderson, University of Wisconsin, the first selection committee will also include Linda Young, Argonne National Laboratory, as vice-chair, as well as Eric Adelberger, University of Washington, Kay Kinoshita, Virginia Tech, and Marvin Cage, National Institute of Standards and Technology. The first awarding of the Francis M. Pipkin Award will be at the APS Centennial Meeting in Atlanta, GA in March 1999.

APS Fellowship Nomination Deadlines

Each year, up to 1/2 of 1% of the APS membership may be elected to fellowship. Submission of a nomination involves the following: completion of a nomination form, submission of the nominees CV and publication list, and providing 2-3 letters of support from colleagues who are knowledgeable of the nominee’s work. Nominations packages should be forwarded to APS Fellowship Program, One Physics Ellipse, College Park, MD 20740-3844 by the deadline listed below for the unit for which the award will be presented. No more than one nomination per department is accepted for consideration. Nominations will be obtained by browsing the Fellowship Page on the APS web site [http://www.aps.org/awards/or calling (301) 209-3268] or emailing the fellowship office at “fellowship@aps.org”, or calling (301) 209-3268.

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The HEU Deal

In September 1991, Presidents Bush and Gorbachev reached an agreement on reduced deployments of nuclear weapons, setting the stage for the first major reduc-
tions in the Cold War. The agreement involved the transfer of 500 metric tons of HEU, the quantity contained in roughly 20,000 nuclear weapons. Russia and the US were to appoint commercial executive agents to carry out the deal. Russia chose Techsnabexport (Tenex), essentially a government export agency, and the US chose the uranium enrichment company USEC. Russia is now a government corporation called the US Enrichment Corporation (USEC) on its way to privatization. By May of 1993 the two governments had initia-
ted a draft contract for the purchase of 500 tons of HEU over 20 years, with an expected value of $12 billion. Used for making fuel, a kilogram of HEU is worth about $24,000, twice the value of gold. The final contract was signed in January 1994.

Problems and Progress

While these developments appeared to be a major victory for arms reduction and non-proliferation, it turned out to be only the beginning of a very difficult process of implementation. For example, at least some Russian HEU contains plutonium, which is now a government corporation called the US Enrichment Corporation (USEC) on its way to privatization. By May of 1993 the two governments had initia-
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Reflections

In hindsight, the HEU deal appears to be an obvious idea. In reality, a new idea is much like a child: conceiving one is nowhere near as hard or time-consuming as raising one. While the monies not spent on actual weapons destruction will ostensibly be used for improvements in reactor safety and other scientific purposes, there is a significant potential that some of these funds will be used to enhance weapons design and production capabilities. However, the HEU deal was not primarily intended as a disarmament program, but rather a non-proliferation action that Russia and the US could agree on. Moreover, the US is hardly stopping its design activities, nor destroying its ability to produce nuclear weapons. There is thus still an important role to be played by traditional arms negotiations. The agreement to ban testing of nuclear weap-
on is an important first step. With some luck, the HEU deal will foster a better climate for arms agreements.

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